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10/578,776	07/18/2006	Hiroshi Sakurai	Q94801	6191
23373 7590 09/16/2009 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037				
EXAMINER MATZEK, MATTHEW D				
ART UNIT		PAPER NUMBER		
1794				
MAIL DATE		DELIVERY MODE		
09/16/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/578,776

**Applicant(s)**

SAKURAI ET AL.

**Examiner**

MATTHEW D. MATZEK

**Art Unit**

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 2-47 is/are pending in the application.
- 4a) Of the above claim(s) 16-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 May 2006 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/3508)  
Paper No(s)/Mail Date 7/09, 8/06, 5/06
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Election/Restrictions***

1. Applicant's election with traverse of Group 1, claims 1 and 3-15 in the reply filed on 7/16/2009 is acknowledged. The traversal is on the ground(s) that the special technical feature of the present disclosure should be nonwoven fabric essentially made of carbon fiber having a diameter of 0.01 to 1 micron. This is not found persuasive because the current claim language uses the open-ended term "comprising", which allows for the presence of additional components. Examiner established in his assertion of a lack of unity that the special technical feature of a nonwoven fabric comprising an aggregate of carbon fibers having a diameter of 0.01 to 1 micron does not make a contribution over the prior art. The term "essentially" is not present in the instant claims and as such discussion of a limitation is immaterial.

The requirement is still deemed proper and is therefore made FINAL.

2. Claims 16-47 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected inventions, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 7/16/2009.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Machino et al. (EP 0 963 964 A1).

Machino et al. disclose the use of a wool-like carbon fiber aggregate (nonwoven) to provide thermal-acoustic insulation (abstract). The fibers have an average diameter of 0.50 to 2 microns [0094]. The carbon fibers have an aspect ratio (L/D) that exceeds 30 (abstract). Claim 15 is rejected as the carbon fiber aggregate may be used as a substrate from fuel cell electrodes.

4. Claims 1, 3 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshikazu et al. (JP 03-008811).

Yoshikazu et al. disclose a melt-blown (nonwoven) carbon fiber layer comprising fibers having an average diameter ranging from 0.03 to 1 micron (abstract). Claim 15 is rejected as the carbon fiber layer may be used as a substrate from fuel cell electrodes.

5. Claims 1, 3, 12, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Reneker (US 2003/0137069 A1).

Reneker discloses an apparatus for forming nonwoven mats of nanofibers (abstract). The nanofibers most preferably have a diameter ranging from about 10 to about 500 nm or about 0.01 to about 0.5 microns [0035]. The nanofibers are cylindrical in shape and are

formed from polymer that is then carbonized at high temperatures [0026] (claim 19). The lengths of the nanofibers provide for the claimed aspect ratio [0035]. Claim 15 is rejected as the carbon fiber nonwoven mat may be used as a substrate from fuel cell electrodes.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 9 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over each of Machino et al. (EP 0 963 964 A1, Yoshikazu et al. (JP 03-008811) and Reneker (US 2003/0137069 A1).

Although none of the applied references explicitly teach the claimed feature of having a water contact angle of 140 to 155 degrees at 20 degrees C and a relative humidity of 65 to 70 %, it is reasonable to presume that said property is inherent to each of the applied inventions. Support for said presumption is found in the use of like materials nonwoven carbon fiber fabrics. The burden is upon Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property of having a water contact angle of 140 to 155 degrees at 20 degrees C and a relative humidity of 65 to 70 %, would

obviously have been present one the Reneker product is provided. Note *In re Best*, 195 USPQ at 433, footnote (CCPA 1977) as to the providing of this rejection made above under 35 USC 102.

***Claim Rejections - 35 USC § 103***

7. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reneker (US 2003/0137069 A1).

a. Reneker teaches that one use of the carbon fiber nonwoven is to create a barrier to chemical and biological agents [0055].

b. The level of porosity of the nonwoven carbon fabric of Reneker is a result-effective variable affecting the fluid flow rate through said fabric and the type and degree to which contaminants are entrapped. Higher porosity leads to higher fluid flow rates, but lesser contaminant entrapment. Consequently, absent a clear and convincing showing of unexpected results demonstrating the criticality of the porosities, it would have been obvious to one of ordinary skill in the art to optimize this result-effective variable by routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

8. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reneker (US 2003/0137069 A1) as applied to claim 1 above, and further in view of Parrish (US 4,861,653). Reneker fails to provide a mass per unit area teaching for the nonwoven carbon fabric.

- a. Parrish discloses a process for forming batts of carbon microfibers (cols. 1 and 2).  
The batts of Parrish are generally used for reinforcement and have a mass per unit area of between 15 and 600 grams per square meter (col. 3, lines 16-28).
  - b. Reneker and Parrish are from the same field of endeavor (i.e. carbon fiber mats).
  - c. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have modified the invention of Reneker with the mass per unit area teaching of Parrish with the motivation of providing guidance for a basis weight of a carbon fiber mat that successfully functions as a structural reinforcement.
9. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reneker (US 2003/0137069 A1) as applied to claim 1 above, and further in view of Fischer (US 5,800,706). Reneker fails to provide a mat thickness for the nonwoven carbon fabric.
- a. Fischer discloses a porous material made from nanofiber packed beds used for filtration (abstract). The nanofibers and continuous fibers are made of carbon. The carbon nanofibers or fibrils have diameters of less than about 1 micron (col. 4, lines 20-68). Fischer teaches a thickness of 8 mils (203 microns) for the carbon nanofiber mat (Example 8).
  - b. Reneker and Fischer are from the same field of endeavor (i.e. carbon fiber mats).
  - c. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have modified the invention of Reneker with the thickness teaching of Fischer as one of ordinary skill in the art would have necessarily looked for guidance as to a thickness that successfully forms a carbon fiber filter.

Reneker teaches that one use of the carbon fiber nonwoven is to create a barrier to chemical and biological agents [0055].

10. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Reneker (US 2003/0137069 A1) as applied to claim 1 above, and further in view of Tennent et al. (US 6,099,960). Reneker fails to teach the use of porous carbon fibers.

a. Tennent et al. disclose a high surface area carbon nanofiber that has a porous outer surface (abstract). The nanofibers are formed into a mat (Figure 10). Preferably the carbon nanofibers have a diameter of less than 0.5 microns (col. 6, lines 14-25). The porous outer layer is formed by coating the nanofiber with a polymer and then pyrolyzing said polymer (col. 8, lines 10-42).

b. Reneker and Tennent et al. are from the same field of endeavor (i.e. carbon fiber mats).

c. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to have made the fibers of Reneker with the porous outer layer of Tennent et al. with the motivation of increasing the fibers' surface area, which is beneficial to the carbon fibers of Reneker which act as a filter. An increase in surface area in a filter increases its efficiency.



### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 3, 6-8, 9, 14 and 15 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5 and 15 of copending Application No. 10/592,153. The level of porosity of the nonwoven carbon fabric of ‘153 is a result-effective variable affecting the fluid flow rate through said fabric and the type and degree to which contaminants are entrapped when the fabric is used as a filter. Higher porosity leads to higher fluid flow rates, but lesser contaminant entrapment. Consequently, absent a clear and convincing showing of unexpected results demonstrating the criticality of the porosities, it would have been obvious to one of ordinary skill in the art to optimize this result-effective variable by routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Although the conflicting claims are not identical, they are not patentably distinct from each other because the assembly of applied claim 15 constitutes a nonwoven fabric. The carbon fibers diameter and

aspect ratio are provided for in the applied application. Although the applied application does not explicitly teach the claimed feature of having a water contact angle of 140 to 155 degrees at 20 degrees C and a relative humidity of 65 to 70 %, it is reasonable to presume that said property is inherent to '153. Support for said presumption is found in the use of like materials nonwoven carbon fiber fabric. The burden is upon Applicant to prove otherwise. *In re Fitzgerald* 205 USPQ 594. In addition, the presently claimed property of having a water contact angle of 140 to 155 degrees at 20 degrees C and a relative humidity of 65 to 70 %, would obviously have been present one the applied product is provided.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Information Disclosure Statement***

12. All references set forth in the Information Disclosure Statements (IDSs) and the supplied search reports have been considered. Examiner has applied only the references that he considers to read on the instant claims or has relied upon another version of the references listed in either the IDSs or the search reports.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW D. MATZEK whose telephone number is (571)272-2423. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571.272.1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew D Matzek/  
Examiner, Art Unit 1794